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ABSTRACT

Thirteen teaching approaches for the effective presentation of the metric system are identified. The hands-on approach, special features of the metric system which make it convenient to use, metric concepts which should be stressed, and the effect of the change to the metric system upon other areas of mathematics curriculum are among the topics discussed. (DT)

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A Look at Metrics and THE METRIC TEACHER

by

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Educators must take the lead in educating students, consumers and other educators as the U.S.A. adopts the metric system. Use of the metric system of measurement has been slow in being actualized. As early as 1785 Congress adopted a decimal currency system. In 1817 John Quincy Adams completed a four year study in which he expressed favor of the metric system of measurement. By 1866 use of metric weights and measures was made legal by Congress. The metric system was established as a world standard by the International Bureau of Weights and Measures as early as 1875.

What characteristics exemplify the effective teacher of the metric system? I view the metric teacher as possessing the characteristics discussed in the following paragraphs.

THE METRIC TEACHER should possess skill in working with the metric system of measurement. Since there is research that indicates that teachers teach somewhat as they were taught, it is hoped that teacher competence in metrics has been gained through a hands-on approach.

THE METRIC TEACHER thinks metric as a result of a multitude of first-hand experiences in measuring, estimating, and verifying measurements utilizing metres, kilograms, and litres. An intuitive knowledge of metric measures is not likely to be gained vicariously. Students, and teachers as well, need a multitude of first-hand experiences in using metric measures in order to gain a working knowledge of the metric system. Those individuals who have familiarity with the customary system may come to associate the metre as being a little more than a yard, the kilogram as a little more than two pounds, and

the litre as a little more than a quart. The gram itself can come to be associated with the weight of a paper clip. Such associations are arrived at through discovery and are probably not stressed directly in the teaching process. Learners who have little or no familiarity with the customary system quickly grasp the new concepts without reference to any other system.

THE METRIC TEACHER encourages students to think metric -- rather than stressing the use of common conversion tables for converting measures between the customary system and the metric system. Those who rely upon conversion tables most often fail to gain a true feeling for metric usage. Traditional conversion tables function as an educational crutch without which the student may be unable to function efficiently at a later time. Conversions within the metric system that stress base ten relationships are a viable type of conversion activity as these enhance understanding of the system.

THE METRIC TEACHER should possess affective qualities that will enhance concept presentation. An acceptance of the metric system and an appreciation of its advantages would seem to facilitate its teaching. The simplicity of teaching computations involving whole numbers and decimals, rather than having to work with fractions and mixed numbers, is noteworthy. Calculating almost any problem using both the conventional method and the metric system usually convinces one of the greater simplicity of metric measures. Complexity is lessened in the metric system due to its relationship to the base ten system.

THE METRIC TEACHER, during the period of transition, emphasizes

the increasingly greater contemporary uses of the metric system as evidenced in photographic film sizes, prescription preparation, space technology, sporting events, food labeling, automobile and bicycle parts, farm and construction equipment, computers and office equipment, etc.

THE METRIC TEACHER values the interrelatedness of the metric system as contrasted with the customary system. The latter can hardly be referred to as a "system" with 56 kinds of bushels, eight kinds of tons, dry and liquid quarts, and troy and avoirdupois pounds. The customary system is made up of a multitude of unrelated units, such as the pound, gallon, and yard. Conversion factors among units is also arbitrary and inconsistent. In the metric system linear measure is directly related to measures of volume and mass. Interrelatedness can be illustrated by an analysis of the following sentences. The basic unit of length is the metre. The square metre is used to indicate area. The cubic metre is used to indicate volume. A container measuring a cubic decimetre will hold a litre of liquid and weigh a kilogram. The gram, as a measurement of mass is the amount held in a container that is a cubic centimetre in size.

THE METRIC TEACHER relates applicable parts of our monetary system and the base ten system in general to the metric system. In teaching and learning, experiences with the metric system and the monetary system reinforce each other. Such a relationship between monetary and metric measures adds credibility to the notion of the metric system as being a planned, coordinated system.

THE METRIC TEACHER advocates a changeover to the metric system. Classroom teachers must realize their crucial role in helping to disseminate knowledge and skills of the metric system to students, other educators, and to the public as well.

THE METRIC TEACHER utilizes a great variety of visual, tactile, and manipulative aids in facilitating instruction in the metric system. Learners need to be involved in a great quantity and variety of estimating, measuring, and verifying experiences to provide the necessary reinforcement.

THE METRIC TEACHER capitalizes on information and suggestions provided by such organizations as the Interstate Consortium on Metric Education, the U.S. Metric Board, and the National Bureau of Standards. Organizations such as these attempt to bring uniformity to metric practice, report on legislative rulings, suggest reference sources, and suggest placement of various metric topics.

THE METRIC TEACHER utilizes the International System of Units (SI) as a basis for defining units and gaining a knowledge of pronunciations, spellings, use of symbols, and style. Written metric materials and metric sypplies are flooding the market. Purchase of such materials should be based upon how nearly these conform with SI standards. One metric stick on the market is divided into quarters, an unnecessary and confusing division for a base ten system. Use of a common system is negated to the extent that pronunciations, spelling, and the use of symbols are inconsistently used from one place to another.

THE METRIC TEACHER saves energy and teaching time by deemphasizing

fractions that are not related to use of the metric system. It is claimed by some teachers that arithmetic teaching time in this area is reduced by one-third by changing to the metric system. The chairman of the American Geophysical Study of the Metric System has indicated that 25 percent of teaching time in arithmetic courses would be eliminated by going metric. Others have indicated the saving of a year or two if the customary system is replaced by a metric emphasis.

THE METRIC TEACHER acts as a change agent, acceptant and ready for this measurement change - not for change itself - but to facilitate closer communication and increased trade relations with the majority of the world community. Those countries of the world that have not initiated metric adoption can now be numbered on one hand. (Brunei, Burma, Liberia, and Yemen) Metric adoption for the U.S.A. is long overdue.

ABOUT THE AUTHOR

Dr. Charles W. Smith has taught courses in teacher education at Northern Illinois University for the past nine years. Prior to that he taught in the Pennsylvania public schools for twelve years. His doctoral dissertation related to the mathematics teaching behaviors of elementary student teachers. He has also supervised student teachers in grades K-8, and conducted research in the public schools and the university.